

AMERICAN
RAILROAD JOURNAL,
AND
MECHANICS' MAGAZINE.

No. 8, Vol. IV.)
New Series.

APRIL 15, 1840.

(Whole No. 356.
Vol. X.)

ERRATA.

In the number of the Journal for March 1, article on "Atmospheric resistance to locomotion on railroads, etc.," page 139, 17th line, for "palaces now flying," read, *palaces now plying*. Page 141, 4th line, for "Nos. 288 to 291 and 288," read *Nos. 285; to 291 and 288*.

Last No. of the Journal, article on "Theory of the crank," page 205, 30th line, for "contrary varying motion," read *continually varying motion*.

CIRCULAR.

Addressed to the Engineers in the vicinity of, or resident in the city of New York—also to those in the habit of visiting New York, from time to time.

NEW YORK, APRIL 15, 1840.

At the solicitation of several professional gentlemen I have been induced to establish a *Reading Room and Exchange* for Civil Engineers. It is well known that, while every other profession has some one place, at least, in this city, for occasional meeting, and as a resort open to them at all times, Civil Engineers have hitherto been without this convenience. It is proposed to furnish the reading room with the various domestic and foreign scientific periodicals relating to the profession and also with papers from various parts of the Union.

To increase the usefulness of such an establishment, the valuable collection of reports, documents, etc., belonging to the office of the *American Railroad Journal*, will be placed in the Reading Room, as also some of the most important professional treatises. It is understood that several gentlemen are willing to deposit various works for the benefit of the establishment.

The number of Civil Engineers at any one time in the city, is much greater than is generally imagined, as the subscriber has often had occasion to remark. By the method proposed, these gentlemen would have frequent and easy intercommunication, and as Civil Engineers, from all

parts of the Union, are frequently in the habit of visiting the city, it is conceived that, by the plan proposed, the interests of the profession would be in no slight degree advanced.

The Reading Room will be attached to the office of the American Railroad Journal, and I pledge myself, in conjunction with Mr. *Egbert Hedge*, joint proprietor in that paper, to offer every facility in our power to accommodate gentlemen resorting thereto.

Those gentlemen who choose so to do, can have boxes provided for the reception of letters and other communications; and strangers or visitors can have an arrangement made whereby all letters and papers addressed to them, while in the city, can be taken charge of.

It is proposed to open the Reading Room on the first of May next.

Your co-operation and that of your friends is respectfully solicited.

Your obedient servant,

GEORGE C. SCHAEFFER,

Editor American Railroad Journal.

SEASONING TIMBER.

Some time since we received the following note, which should have received attention in an earlier number. Circumstances have prevented us from taking it up until now, and as there are two totally distinct questions, we purpose to consider at present only the first, in the meanwhile soliciting communications on the subject from our readers.

MR. EDITOR—Will you, or one of your readers, oblige me by an answer to these questions?

1. In what does the process called "*seasoning*" of wood consist? Is it in merely drying up the sap and evaporating the water contained in it? If so, can this be as well done by the heat of an oven or furnace, in a short time, as by exposure to the sun and air for a long time?

2. What is the Dutch mode of making the little yellow bricks of which the oldest houses of our city are composed? Is their color owing to the kind of clay used—the mode of burning them—or to both? Are they very much compressed in making, or to what cause is owing their great hardness and durability? Can bricks of such quality be made in this country, and what place furnishes clay of proper quality?

I make these inquiries partly for obtaining information for my own use; and partly in the hope that they may lead others to think of the superiority of the Dutch brick, both as a matter of taste, as regards color, and of durability, (of both of which, I think, there is little room to doubt,) and thus promote the adoption of them in place of the crumbling, staring red bricks of which our cities are so generally built; and the chief qualities of which are, hardness to the eye, and softness under the mellowing hand of time.

Yours,

D*** F*****

The process called "*seasoning*" is a twofold operation depending upon

the constitution of living wood. In general terms, the wood of a tree contains fibrous matter, arranged in the form of minute vessels containing the sap. This sap is chiefly water, but contains besides a variety of soluble salts and organic matter. Wood taken in this, its *green* state, gradually contracts in bulk, and is, therefore, unfit to be used in any permanent construction. The watery particles may be expelled, or the wood dried by heat—and green wood baked in an oven is no longer liable to alter in dimensions; but a more serious evil is then met with. Wood when suddenly dried is cleft or “checked” so much, that in some kinds of timber, its parts may be pulled assunder as easily as if cleft by a wedge. The process must therefore, be gradual, so that the particles may have time, slowly to arrange themselves in a new order, which if suddenly assumed, would tear them from each other. This operation requires time, and hence we suppose the word “seasoning.”

The work of Duhamel, “*Sur l'Exploitation des Bois*,” contains many excellent experiments and practical observations on this subject, a few of them with some additional information, may be found in “Barlow on the strength of materials.”

Duhamel gives an illustration of this process in the preparing of pottery ware for the oven. Vessels of any form, but more particularly solid cylinders, require a very gradual drying or they fall to pieces. The potters to avoid this, expose them in a cool situation, out of the sun for many days, and as the moisture very gradually flies off, the still soft clay has time to re-arrange itself without splitting. Now in wood the matter is less homogenous than in potters clay—and the density of the external and internal portions are never the same. Experiment proved that by delaying in a similar manner the drying of timber the danger of checking was greatly decreased. It was also found, as might be predicted, that when the wood was reduced while green, to a size near that intended for use, the liability to crack was removed, while a thorough seasoning took place in rather less time than when left in the original form.

As a general rule, Duhamel states that *timber* grown in a rather dry soil is denser, harder, and stronger than that grown in a damp or marshy soil. Barlow also says that “generally in a sound tree the density is found to decrease from the butt upwards, and from the centre to the circumference. He likewise gives a table showing the difference in the loss of weight by drying, in their different portions. It follows from this, that a different period of time is necessary in seasoning different woods, or even different parts of the same tree.

Barlow has a very interesting table of some experiments on the seasoning of English oak. Eight pieces of various size were cut from the tree and exposed on the beams of a smith's shop to a dry, but not warm air.—They were weighed at the commencement of the experiment, and afterwards at intervals for five years and a half.

The total weight at the commencement was 972½ lbs., at the end 630½

lbs., being a loss of 341½ lbs., or more than one-third in seasoning. Nearly all of this decrease took place within two years and a half. A remarkable fact is to be noted in this experiment, viz., that the wood again increased in weight when a rain even of two days occurred immediately before the monthly time of weighing. It may hence be assumed that damp or rainy weather may retard the seasoning of timber, and even cause it to retrograde.

The remains of the sap being conceived to operate against the durability of timber, various processes have been devised to assist in removing the organic matter originally held in solution in the sap, and also to expedite if possible the seasoning. Barlow has a paragraph on the subject so much to the purpose that we give it entire.

"The process of seasoning may be facilitated by boiling, steaming, &c., as appears from the following experiments of Mr. Hookey. The three pieces marked Nos. 1, 2, and 3, were English oak, each four feet long, and three inches square; all cut from the same timber. No. 1 was placed in the steam kiln for twelve hours, No. 2 was boiled for the same time in fresh water, and No. 3 was left in its natural state. The weights of the three pieces, previous to the experiment, and at the end of each month for half a year afterwards, were as stated below.

Times of Weighing.	No. 1. Steamed.	No. 2. Boiled.	No. 3. Natural State.
	Weight. lbs. oz.	Weight. lbs. oz.	Weight. lbs. oz.
Previous to the experiment,	16 12½	16 15	16 14
After do.	16 6	16 14	16 14
June,	15 1	15 10	16 5
July,	14 2	14 12	15 14
August,	13 13	14 0	15 5
September,	12 10	13 6	15 0
October,	12 5	12 10	14 12
November,	11 10	12 5	14 8

"Each of the pieces was placed in the same place, in the open air, and in the same position, (i. e. vertically,) after the experiment, and were continued so during the six months that their weights were taken.

"From the above, it appears that the process of seasoning went on more rapidly in the piece that was steamed than in that which was boiled; but that in the latter, the process was carried on much quicker than in the piece which was left in its natural state:

The first had its specific gravity reduced from 1050 to 744.

The second from 1084 to 788.

And the third from 1080 to 928.

"We must look to the philosopher for a satisfactory solution of the pro-

blem presented in these results. Mr. Hookey* accounts for the facts by supposing, that the process of boiling or steaming dissolves the *pithy* substance contained in the air tubes, by which means the latter fluid circulates more freely, and that the seasoning thereby proceeds with greater rapidity."

But these are not the only means of facilitating the seasoning of timber. In a process for preserving timber which we have several times noticed, (and of which an advertisement may be seen on our cover,) the wood is subjected to such a heat as fills all the vessels with steam, and on its immersion into a cold solution of, a peculiar resinous compound, the steam is condensed and the antiseptic compound forced quite through the stick.

It is manifest, that by this, or any analogous process, the sap is deprived of all power of injuring the quality of the wood—while the greenest timber is immediately seasoned, for all moisture is expelled, and checking cannot take place, as the pores or vessels are instantly filled by the resinous matter which keeps them distended to near their former size. No shrinking or alteration of fibres need take place, and hence the whole object of "seasoning" is answered without waiting "*a season*."

The importance of thus accomplishing two important objects by one operation and without loss of time, is not to be overlooked. In the construction of railroads in timber countries, an immense saving of money and time might be made at the same time that the durability of the structure is insured.

The following is one of many excellent papers in the *Annals des ponts et chausees* which have never yet appeared in an English dress, and which we have translated for the benefit of our readers.

Although the article on breaking stone was published some time ago, it has not lost its value. In fact, an additional interest belongs to it, when considered in connection with the more common modes of constructing railroads—broken stone constituting no small portion of the material. It will be seen on referring to the Report of Camden and Amboy railroad company, that they have expended the enormous sum of \$103,372 64 cents for *broken stone*. How much of this might have been saved by the substitution of mechanical for intelligent power, we do not pretend to say, but that *some* saving would result, is beyond all doubt.

We hope that American ingenuity will yet supply the desideratum so well delineated in this article.

ON BREAKING STONE.

Extract from an article by M. E. F. Noel, Ingenieur des ponts et chausees.

The breaking of materials intended for working stone roads, is a yearly work of considerable magnitude. Without being able to state precisely the bulk of stone broken annually in France, and applied simply to the working of the royal and department roads, I do not think it can be less

*To this gentleman is due the ingenious idea of bending large ship timbers.—See Transactions of the Society of Arts, vol. xxxii.

than 4,000,000 cubic metres. To this amount is to be added that of the stone employed for roads in process of construction, an uncertain amount, but considerably augmenting the number of millions of cubic metres. The art of stone breaking is thus employed upon an immense mass of material, and becomes a matter of great importance. Nevertheless, the operation is carried on exclusively by manual labor, and in the most imperfect manner.

It is well known that the blow is the most disadvantageous employment of power, and that in all kinds of machines, it is important to avoid all shocks on account of the loss of power which they occasion. Now, the breaking of stones is nothing but a repetition of frequent blows, and what is worthy of remark, the power which is thus lost in these multiplied blows, is the most valuable and the most dearly purchased—that of man. The imperfection of the operation is manifest, for it is very costly. English engineers have advised, and with propriety, to cause the breaking of stone to be done by women and children, seated, and furnished with a light hammer, having a short handle, this method is in fact preferable to breaking with heavy blows of a long handled sledge, used by a strong man, standing up. But it is only applicable when the materials are already reduced to a size not more than double that which is desired, for when they are larger, when, for example, rough stones from the quarry are to be used, breaking them by children, seated, is impracticable, and it will then be necessary to use a sledge, and to work it standing. In this case, there must be a double breaking. The first, to crack up the rough stone, and the second, done by children, seated, to reduce the stones thus broken, to the desired size, which should be such that each piece can be passed through a ring .06 of a metre (about 2.3 inches) in diameter.

Besides this mode of operating, by short hammers and seated workmen, although, in fact, far preferable, has to encounter prejudices very difficult to overcome, both in the contractors and in the workmen themselves, so that the use of the long sledge, worked by strong men, standing, and constantly bent over, is the plan most generally followed.

To the most striking inconvenience of this method, which consists in employing, at a dead loss, a large amount of intelligent power, must be added the difficulty of breaking the stones properly and uniformly—the scattering of the broken stone, which must be picked up—the loss of the detritus which is spread on the ground and cannot be collected—and also the opportunity which the workman has to defraud by neglecting the breaking of the centre of the heap.

Under these circumstances, it would be desirable to apply some mechanical means to the breaking of stones. It appears that there can be employed for this purpose, a machine composed either of a core or spindle, furnished with projections, and turning upon its axis in the interior of a circular piece likewise furnished with projections*—or of two cylinders horizontally channelled or fluted, and turning towards each other, with a space left

*Resembling a coffee or brick mill. [Ed.]

between them—or lastly, of a single moveable cylinder, revolving on its axis over a fixed parallel plane, and producing the crushing between itself and the plane. These instruments should be made of very hard steel, and in order to avoid their fracture, by reason of the hardness, or particular position of a stone, the pieces against which the strain is exerted, might be so arranged as not to be altogether rigid and fixed, and to give way before the strain when it approaches a certain limit.

Thus, for example, the circular piece, in the centre of which the spindle of the stone mill turns, instead of being fixed, might be made of three or four segments, susceptible of a movement from the centre, to let pass unbroken fragments offering too great resistance, when these pieces shall have exerted upon them a strain capable of moving the springs which keep them in their proper position.

A very strong fly wheel will also be necessary to assist the power, since this will have to overcome very variable resistances.

There must also be arranged between the breaking instrument and the recipient of the broken material, a suitable apparatus for sifting these materials, so as to separate the fragments of various sizes, from those which have passed through the machine without being broken down to the detritus or powder.

It is very probable, that a single instrument will not suffice, and that to obtain the size desired, there must be, when rough quarry stones are used, a series, more or less numerous, of this sort of tools.

The solution of this problem will render a great service, in point both of art and economy—and in this view it will be desirable that those engineers who have already made any experiments upon breaking stone by machinery, should give to the profession the results of their labors, through the medium of the *Annales*.

GREAT WESTERN RAILWAY IN UPPER CANADA;* EXTRAORDINARY ADVANTAGES OF THIS ROUTE TO THE CITY OF NEW YORK AND TO SOME OF THE WESTERN STATES.—W. R. Casey, Civil Engineer.

"The aim of this paper, is to place in their true light the objects and advantages of the Great Western Railway. It does not profess to embrace all the merits of the question, but it is an attempt to bring forward the more prominent and the very peculiar advantages offered by this route to the city of New York, and some of the most flourishing parts of the West. It does not dwell on the beneficial effect the road must have on the general prosperity of the Province—and especially on that part through which it will pass, for this is much better understood by the permanent residents of the country—but it investigates the claims of the Great West-

* The Great Western Railway is to run from Hamilton, at the western extremity of Lake Ontario to the river, or Lake St. Clair, its western terminus not having been decided on. The quoted passages and the substance of the remarks generally, are from an unpublished memoir written in 1837, in which year a copy was given to the Hon. John Hamilton of Queenstown, U. C.

ern railway to rank as an important link in the best chain of communication between the West and the waters of the St. Lawrence and the Hudson.

These two rivers may be considered as the grand feeders of the Great Western railroad. By the former it will receive travellers and emigrants from both provinces, as well as from the northern parts of New York and of the Eastern States embarking on the St. Lawrence and on lake Ontario; by the latter, travellers and emigrants from all parts of the world, by the way of New York. Now, it is obvious, that the western railroad is the best possible route for the former, and it remains to be shown, that it offers the quickest, easiest, cheapest and earliest route to the country west of Sandusky for all travellers by the Hudson, whether they take the direct route across Ontario, or continue, on the New York railroads to the Falls.

A large proportion of the present population of the States of Ohio, Indiana, Illinois, Michigan and of the Territories still farther west is supplied with goods from the city of New York, to purchase which, the country merchants make annually one or more trips to that city. These form a very profitable class of passengers, paying the highest fare, and producing a fixed income. Although the agricultural products of the country will continue to go by Lake Erie, the merchants themselves will take that route to New York which requires the least time. The number of travellers between the north western part of Ohio, the northern part of Indiana, and of Illinois, the State of Michigan and the western Territories is well known to be very great and steadily increasing, in addition to which, crowds of emigrants must yet for centuries flock to the boundless west. It should be the object of the Great Western railroad to secure this business, which it can only do by offering superior advantages to travellers between the Atlantic and the mouth of the Maumee river and Detroit—the keys to the country west of Sandusky. As already observed, local business is omitted, not because its present importance and steady future increase are not appreciated, but, because it is believed, that the western travel alone exists, and may be commanded to an extent sufficient to ensure an immediate and handsome return for the capital invested in this undertaking."

It would appear at the first glance that the Great Western railway must contend, on something like equal terms, with the roads from Boston, New York and Philadelphia, striking Lake Erie at Buffalo, Dunkirk and Erie, but the grand rivalry is between lake Erie and Ontario, and it is to the superior natural advantages of the latter, as regards position and navigation almost uninterrupted throughout the year, that the Great Western railway will be indebted for its importance as forming part of the best avenue to the western States.

The most striking feature in this route is—that a railway from Syracuse to Oswego only 35 miles long, will complete the communication by

steam between the city of New York and a point as far west as the extreme western boundary of the State, that is 50 miles west of Buffalo. The next important advantage is, that this point may be reached in the spring from one to two months before the navigation of Lake Erie is open at Buffalo. The third peculiarity of this route arises from the happy division of land and water travelling—the former being accomplished by railway in the day time, the latter by steamboat in the night time—the mode of travelling preferred to all others in this country. Although passengers may be landed 50 miles to the westward of Buffalo by the middle of March or as soon as the Hudson is navigable, their further progress is cut off, and without the Great Western railway the route thus far is useless. It is for the want of this road that the winter and spring route from Detroit to New York is by way of *Philadelphia*, and not unfrequently by *Columbus (Ohio)*, *Wheeling (Va.)* and *Baltimore*. The city of Detroit is frequently alluded to, and it may be well to state, that it is the travel through and by that place, which the western railroad should endeavor to draw to itself. Two or three steamboats leave Detroit daily for Buffalo during the season of navigation, and the number of passengers and emigrants is immense. Next to Detroit, Toledo and other towns at the mouth of the Maumee will furnish the greatest number of passengers, and numerous intermediate places, as well as others north of Detroit will also add to the travellers by this route.

At the time the original paper was written, the western terminus had not been fixed. There was also a project for a railway, from Berie (opposite Buffalo,) to Sandwich, (nearly opposite Detroit.) The relative merits of the western termini, or rather the principles on which they should be compared, were investigated. The difference in distance of the rival western termini, (Sarnia at the southern extremity of lake Huron and Chatham on the Thames near Lake St. Clair) from Hamilton on Ontario was considered one of the leading points, but as an article on this subject, part of which was copied from the paper on the Great Western railroad, was published in this Journal of August 1839, it is unnecessary to make any further remarks upon it; besides this, circumstances, which have occurred since that time, point out the propriety, if not the necessity, of placing the extensive establishments at the termination of so great and important a thoroughfare in a more secure position than immediately on the bank of the St. Clair river. This consideration will also outweigh any trifling advantage possessed by Sarnia as regards distance from Hamilton, or from Detroit, or better navigation, and though an open question in '37, can scarcely be viewed as such at the present time.

The route by Bertie (Buffalo) was also examined and compared with that by Hamilton and the following are the concluding remarks:

"In comparing the routes by Bertie and Hamilton they have been considered only as valuable to travellers by the St. Lawrence and Hudson rivers, and, even in this point of view, the superiority of the latter is evident,

but it would be preposterous to overlook the vast advantages which a railway through the heart of the Peninsula would confer on the Province, as compared with the benefits to be derived from a road skirting the northern shore of lake Erie. The route by Bertic sacrifices the shipping of Ontario, opens the least possible extent of country and is anything but Canadian in its objects, though it is readily admitted, that it will find favor with the inhabitants of Buffalo and perhaps with some of the railroad companies to the westward of Syracuse."

If these views were entertained early in '37, when the incursions from Detroit and Buffalo could not have been imagined, it is needless to say, that they apply with tenfold force now to the interest and security of the British and American traveller, as well as to the general developement of the resources of the peninsula by the great western railroad. The advantages offered by railways for the rapid transportation of men and munitions of war have been advanced as prominent if not principal arguments in favor of certain railroads in this State. It is very true that railways have this power, but they have in a still greater degree the infinitely higher and nobler power of preventing war by the rapidity with which communications, preventing serious misunderstandings, are carried over them, as well as by the ease with which a competent military force can be, as it were by magic, placed at once in the midst of those, on whom any other argument is wasted. Unfortunately such characters abound on the frontier and any means of communication by which either the Canadian or American authorities can act energetically and without loss of time, is of equal importance to the honor and interests of both countries. War is the very worst purpose to which railways can be applied, and it would be much more politic as well as just to advocate their great importance in a "pacific," rather than "a military point of view." The Great Western railroad will, like the Great Western steamer, aid powerfully in maintaining those relations of peace and good feeling so evidently important to both countries, that not a shadow of an argument can be brought forward in favor of a contrary policy.

The discussion of the relative merits of the routes by Buffalo to Detroit (Bertic and Sandwich railway,) or by Hamilton to Detroit (Great Western railway) as well the comparative claims of the rival termini of the latter route (Sarnia and Chatham) could be attended with little interest now, though leading questions in '37. The advantages of the Great Western railroad running from the head of Ontario (Hamilton) to Chatham on lake St. Clair will, therefore, now be considered. Passengers leaving New York at 5 in the evening, reach Albany (150 miles) early next morning; the distance thence to Oswego by railroad is 180 miles which can easily be accomplished by 5 o'clock in the evening, then embarking on Ontario, they will reach Hamilton (160 miles) at 9 or 10 o'clock in the morning of the second day, thence by the Great Western railway 140 miles to Chatham, where they would arrive at 4 or 5 o'clock in the afternoon, thence by steam-

boat to Detroit, which they would reach at 8 or 9 o'clock in the evening of the second day—requiring in all 51 or 52 hours from New York to Detroit, or 48 hours only if a speed of 20 miles per hour could be maintained on the New York railways, or 12 miles per hour across the lake, both of which will eventually be done.

Passengers by way of Buffalo, will in a few years, accomplish the distance between that city and New York in 32 hours; embarking then for Detroit they will reach their destination in from 30 to 36 hours, requiring 12 hours more than by way of Oswego and Hamilton. The two routes coincide from New York, to Syracuse when they separate, and, calling the distance from Buffalo to Detroit 310 miles, the route from Syracuse to Detroit, by way of Buffalo will be about 485 miles, that by the Great Western railroad about 385 miles, hence the saving of 10 or 12 hours in time, as well as some fatigue and expense. This difference in time would scarcely be affected by a railroad 350 miles long on the southern shore of lake Erie, and is in itself abundantly sufficient to draw to the Great Western railway the best part of the travel of lake Erie.

The next advantage of this route arises from the well known facts that lake Ontario and the western part of lake Erie are always navigable, at least as soon as the Hudson river. Thus in 1837 the ice left Oswego harbor (the lake never freezes) on the 1st March, and though a light steamboat from Buffalo did slip through the ice and reach Detroit on the 20th May, yet the navigation again closed and was not fairly opened till June. In 1838 the navigation was free through the lake about the end of March and thus it varied 2 months in two successive years. In 1837 a schooner from Detroit reached Sandusky on the 1st April, and as Ontario was open long before this, passengers and goods might have been landed at Sandusky, Maumee and Detroit more than two months earlier than by way of Buffalo. Thus in the year 1837, the entire spring travel would have been over before the ice had left lake Erie, and the country merchants of Ohio, Indiana, Illinois, Michigan, etc., would have not only received, but would have sold a large portion of their spring goods long before they could have been shipped at Buffalo. In the present year (1840) the steamboat Erie of Detroit reached Cleavland on the 10th March, and with the Great Western railroad passengers could have reached Cleavland in $2\frac{1}{2}$ days by way of Detroit instead of going by way of Philadelphia in from 6 to 10 days, and with a proportionate expenditure. The great rival lines of Pennsylvania are to strike lake Erie at Erie, and as passengers and goods can, on an average of years, reach Detroit by the Great Western railway several weeks before thenavigation is open at Erie it is obvious, that in addition to all its other advantages, New York would have the *earliest* communication with the very best part of the western country, were this road in operation.

With the existing laws of this State the spring trade could not go by the Great Western railroad, but as a modification is confidently expected, which

will grant to private enterprise the privilege of carrying freight when the laws of nature prevent the State from doing it herself, there can be little doubt, that the western traders will gladly avail themselves of the permission and, during the four or six weeks of navigation of the Hudson, before the opening of the canal, would transport as much as possible to Oswego, whence they could, at their leisure, send it to its western destination. By this route they will also save the "canal tolls," which the State exacts from the railways, on about 160 miles of canal, and, as the rush of spring business does not last more than four or six weeks, this route will offer great advantages to the trade and travel of the country west of Sandusky, as it may be nearly all done before the canal opens.

This route would confer still greater advantages on emigrants. By reaching New York by the end of March, they could be settled in their new homes in the wilderness of Michigan, Illinois or Indiana, about the end of April, in time to plant a crop of corn and potatoes, and thus save nearly a year. As the baggage of emigrants is called "freight," they can even with the modified law which is expected, only be allowed to use the railway when the canal is frozen; at all other times they must go by the State canals. The Oswego canal is, however, a State canal, hence the emigrant will, by leaving the Erie canal at Syracuse, and embarking on Ontario, at Oswego, be enabled to pursue his journey from the latter port to Detroit, at the rate of 10 miles per hour, instead of continuing on the Erie canal, at the rate of 2 and $\frac{1}{2}$ miles per hour, to Buffalo. The Government cannot force him to travel by canal any further than Oswego, so that during the season the canal is navigable, he will be enabled to avoid nearly 200 miles of canal travelling, and will consequently save 2 or 3 days, besides the ordinary expenses for that time. To the emigrant, therefore, this route offers such advantages as to distance competition, either before or after the opening of the Erie canal.

The subject of early freight to the West, has been introduced as a specimen of business which *might* be created by this road, and though of vast importance to the city of New York and the Western States, is of comparatively little importance to the Great Western railway, for this will depend more for its income on the numerous passengers who now pursue the tedious and tortuous course of lake Erie, than on all other sources together.

"The third peculiar feature in this route is, that the nights are passed in steamboats. Thus the first night is passed on the Hudson, the second on lake Ontario, and passengers for Maumee or even Sandusky would, by passing the third night on the Detroit river and the eastern end of Lake Erie, reach their destination early in the morning of the third day, thus requiring two days and three nights from New York to Sandusky or Maumee."

The length of railway by the two routes is the same, about 320 miles, but half the distance on the *continuous* railway from Albany to Buffalo, must be accomplished in the night time, besides changing cars two or three

times; whilst the travellers by Oswego, may pass the night in comparative comfort on the Lake, reaching Hamilton in the morning. By Buffalo there is 320 miles of continuous railway, and 310 miles of continuous lake navigation from Albany to Detroit; by way of Oswego, 180 miles of railway, then 160 miles of lake navigation, then 140 miles of railway, then 50 miles of river and lake navigation.

Experience on the great northern and southern lines on the coast, has shown that passengers are glad to avail themselves of change from railway to steamboats, especially in the night. Very few persons are liable to be seasick when lying down in the night, and almost as few escape it in the day time; on this account, the passage across lake Ontario in the night, would be in a great measure free from that dread with which most travellers regard the passage of lake Erie, on which they must spend, at least, one day.

Still, the Great Western railway cannot be considered exactly as a rival of the line from Albany to lake Erie, for it will offer the best route from the falls to Detroit throughout the year, thus furnishing rather a continuation of that line. Passengers at the falls, may take steamboat thence to Hamilton, and reach Detroit as soon as those going all the way by lake Erie, and persons wishing to avoid the great lakes "in toto," can, by riding 45 miles from the falls to Hamilton, avoid the risk of seasickness, by losing 10 or 12 hours in time. "The railway between Syracuse and the falls, will compete with the boats on lake Ontario, but both will be tributary to the Great Western railway." The great object of the latter will be, to divert to itself the most profitable part of the present immense travel on lake Erie, which it will endeavor to do, by offering a *cheaper, quicker, easier and earlier* communication between the city and State of New York, and the country west of Sandusky, than can possibly be had by *any* route terminating on lake Erie.

The effect of this road on winter travelling to and from the West, will be very beneficial, and will materially add to the income of the line from Albany to lake Erie. Indeed—taking into consideration the number of travellers wishing to see western New York, the falls, and those desirous of avoiding the lakes, and, adding to these, the great number of winter travellers which these new facilities will necessarily produce—it is not unreasonable to infer, that the railways west of Syracuse would, on the whole, be rather benefitted than otherwise by the construction of the Great Western railway.

Not so, however, with the travel on lake Erie. The Great Western railroad, by offering superior advantages to the merchant, traveller, and emigrant, must infallibly draw to itself a large proportion of the "through passengers," the most profitable part of the business; it will also aid materially in changing the *time* of travelling in the spring; this can scarcely be said to commence now till May, whereas, with this new avenue to the

West, the best part of the spring travel would generally be over by the time lake Erie was free from ice. It is true, that in '38, the difference between the two routes would have been trifling; but in '37, the difference would have been more than two months! This extreme uncertainty of the route by Buffalo, is its worst feature. At the present time, (18th March,) the navigation has been open 2 weeks from Detroit to Cleavland, and, if westerly gales do not prevail, it *may*, in a few days, be free to Buffalo, otherwise it *may*, as in '37, be closed till June. In this state of things, many of the western traders would come to the city before the opening of lake Erie, (in ordinary years,) and not unfrequently return before that event, by means of the Great Western railway, and a considerable portion of the present spring travel by lake Erie would be over, before winter would permit the steamboats of the lake to enter into competition with the steam-car of the Great Western railway.

To form a *perfect* communication throughout the year, would require a railway 45 miles in length, from the falls to Hamilton, and from Chatham, or wherever the western terminus might be, to Detroit. When the roads are in their worst state, the navigation at Detroit is nearly always open, and steamboats can ply on Ontario nearly all winter. In the most possible event it would only delay the traveller a single day and he would reach New York in 3 days, instead of, as now, occupying from 10 to 14 days incessant travelling round lake Erie to Cleaveland, and thence through Philadelphia to New York. These two railways, connecting the termini of the Great Western railway with Buffalo and Detroit, would be used by a comparatively small number of travellers during the winter, and very little during the principal travelling season, hence it would be, in every point of view, injudicious in the Great Western railway to extend itself beyond what is absolutely necessary to give it a decided advantage over the route by lake Erie. Great thoroughfares, only, will justify the construction of large works in a new country, and the vast importance of reducing the length of a railway as much as possible, a subject which occupied some space in the original paper, has been, as already observed, published in this Journal. When there is no difference in distance, passengers may be carried in steamboats for much less than on railroads, and this would give a decided advantage to the boats from Chatham to Detroit, moving through smooth water, over a railway between the two points, for, at least, 9 months in the year, comprising, probably, more than nine tenths of the travel. The Camden and Amboy company, owning both railway and steamboats from Bordentown to Philadelphia, use the latter during the entire season of navigation, and as this company is eminently well managed, and as this practice still continues, after seven years experience, we must admit it to be very strong evidence of the superiority of steam navigation, on rivers, over railways—when the *distances* are nearly equal.

"It is an important object to know the minimum amount of income necessary to repair and renew the road and pay interest on the capital."

This subject was examined in detail, but now it will be sufficient to state that the cost of the Great Western railway may be assumed at \$16,000 (4,000*l.* currency) per mile with everything requisite for an extensive *passenger business* and of course a single track. This is about the cost of the Utica and Schenectady railroad, deducting the cost of right of way, superstructure, and graduation of second track, and for 140 miles would amount to \$2,240,000 (560,000*l.*) or in round numbers 600,000*l.* (\$2,400,000.) The interest on this sum would be, at 5 per cent. \$120,000, and is entirely independent of the amount of business, as will also be the repairs and renewals of roadway, to some extent. Estimating these latter at \$400 per mile, and we have for repairs and renewals \$56,000 and adding the interest \$120,000, in all \$176,000. The cost of engines, cars, buildings, etc., will be in proportion to the business, as well as the wear of the same, fuel oil and wages. To arrive at any definite statement of expenditure, it is necessary to assume a certain number of travelers, and supposing these to be 50,000 per annum, and that the cost of transportation, exclusive of interest and repairs of road, is one cent per passenger per mile, we have \$70,000, which added to \$176,000 gives \$246,000 (61,500*l.*) per annum as the minimum income required to pay interest and all expenses on the transportation of 50,000 passengers over a railroad 140 miles long, the entire capital expended being 600,000*l.*; or a gross income of very little more than 10 per cent. on the capital. Judging from the cost of other works in the Province, this estimate may be considered very low, but a railroad in the Lower Province has been built for much less and there can be no doubt that a railway through so easy a country, could be completed with the heavy iron rail for from \$20,000 to \$22,000 (5,000*l.* to 5,500*l.*) per mile, with all complete for an extensive business in passengers *only*.

The usual fare on railways is 4 cents per mile or \$5.60 for 140 miles, but assuming only \$5 as the charge and the income from 50,000 passengers would be \$250,000. Although \$250,000 be but a small part of the sum paid by passengers on lake Erie, some years will elapse before the country through which the road passes will furnish that amount of business, yet this is indispensable if the work be expected to support itself. That the western travel alone exists to a far greater extent than this is well known, and whether the reasons given in this paper for supposing that the Great Western railroad will be able to divert to itself a large proportion of the travel on lake Erie, are sufficient to justify this assumption as well as to establish its claim to rank as the best route from New York to the country west of Sandusky, is respectfully and confidently submitted to the intelligent reader.

The ultimate, though not very distant prospects of this work are worthy of notice. An inspection of the map will show, that the navigable waters and artificial communications from the East converge towards Ontario, those from the West towards lake Erie. Thus we have the St. Lawrence, the Hudson and the railway from Boston to Albany to bring the traffic of the

country bounded by the St. Lawrence, the ocean and the State of New York to Ontario, and on the other side, the Maumee canal and the Detroit, and St. Joseph's railroad both point to the western end of lake Erie. The completion of these two works may be looked forward to as not very far off, now that the grand "systems" have exploded, and the construction of the Great Western railroad would do much towards hurrying on the Detroit and St. Joseph's railroad which will eventually be its most important tributary, for it will necessarily command the travel of Michigan, part of Indiana, the best part of Illinois, all Wisconsin and Iowa, forming with the Canadian Peninsula, the most valuable agricultural district in N. America.

Other topics, which would be uninteresting here were alluded to;—among the rest, the impolicy of commencing active operations until it is certain that the amount required to put the road into efficient operation can be commanded, and the still worse policy of opening, in part, a road which depends principally on "through passengers" for its success; to which causes may be principally attributed the insignificant progress of the Baltimore and Ohio railroad for the last 5 or 6 years. The propriety of adopting this as a Provincial work was suggested, but, although the most important work which could be projected in either Province, the experience of Pennsylvania held out little encouragement to the cause of Government railways, even at that time, and, after the union of the Provinces, the case will be hopeless, for the French party will go "en masse" against the system of government works from their general dislike to innovation, and many of the other party, including some of the most influential, are strongly opposed to it on constitutional grounds; besides which, the, with one exception, complete failure to meet their ordinary expenses, and interest—of all the State works in the Union, would, of itself, be sufficient to cause men of sound judgement to move with the utmost caution. Whether the experience of Upper Canada proves, that the very large sums expended on internal improvements in that Province have been laid out on these works which the wants of the community most and soonest require and which the means of the Province are adequate to carry through, is a question which, if answered in the affirmative, would show a state of things the reverse of what exists here, and would constitute one honest argument in favor of a policy which, its best friends must admit, is utterly at variance with British institutions.

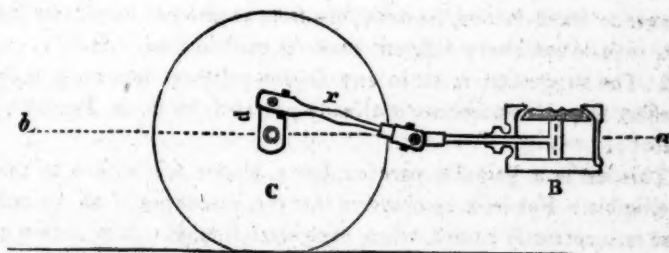
It is impossible, at the present time, to form any idea of the effects to be produced by the great political change about to take place in the Canadas but, whether ever completed or not, the route of the Great Western railroad offers advantages which can never be found in any communication between New York and the West by way of lake Erie. It is impossible to point out, on this continent, a work of equal magnitude, requiring only an expenditure of from 2 to 3 millions of dollars, the completion of which will be attended with such important results to the Eastern States, New York and the best part of the Western country.

The Great Western railway will offer the cheapest and quickest route, because it will be shorter than any other—the easiest, because the night will be passed in steamboats, and the earliest, because Ontario and the western part of Erie open long before the eastern. However long its completion may be delayed, it will, when completed, become, at once, the great western thoroughfare, for its advantages over any other route which can be projected, are owing to natural causes which no competition can affect, and it is not unreasonable to infer, that the opening of this very properly styled "Great Western railway," will produce as great a change in the "travel," as the opening of the Erie canal did in the "trade" of the West.

CRANK MOTION AS CONNECTED WITH DE PAMBOUR'S EXPRESSION OF THE POWERS OF LOCOMOTIVE ENGINES.—By W. McClelland Cashman, Civil Engineer.

Attempts have been made on many occasions, by different individuals, to account for the failure of de Pambour's formula by attributing the errors to loss of effect from crank motion; and this suggestion is in some degree plausible, as that gentleman does not notice, in direct terms, the effect of the crank in modifying the force actuating the piston. It may, however, without any trouble be shown to be inadequate to account for the well established deviations of this formula. It has not indeed any degree of pertinence to such an inquiry.

These positions are easily made out. But in the first place, I will illustrate briefly the operation of the crank in transferring the power from the piston to its working point upon the wheel, which will best be done through the medium of a diagram.



In the annexed sketch, B represents the piston, C the wheel worked by the crank, r the connecting rod, and d the arm or throw of the crank. The expansive force of the steam is of course exerted, reciprocally, in the direction ab . Now this force in passing from this its primitive direction to its final direction in the tangent to the rotary circle of the crank, must evidently lose two proportions—one determined by the sine of the angle included between r and ab , the other by the sine of the angle included between r and its final direction. It would be easy to express generally, in terms of these angles and of r and d the amount of power actually oper-

ative upon the end of the crank at any point of its revolution; and by means of the calculus to sum the total amount of force expended during a complete revolution. This compared with the amount of expansive force exerted upon the piston (after allowing for virtual velocity) during the same period—that is a double stroke of the piston—would exhibit precisely the proportion of power lost through the intervention of the crank and its gearing. A procedure like this is conceived to be the only means of arriving, mathematically, at a true result. A theoretic investigation of this point, is, however, quite unnecessary to relieve the main question of all embarrassment—for these reasons.

1. Because the loss of effect from crank motion will not account for the errors of the formula.

A decisive circumstance is entirely overlooked by those who rely upon this principle for this purpose. It is quite evident, that whatever may be the absolute loss from the crank, that it will be on some constant relation to the power expended on the total resistance. Unfortunately, however, the results of experience and those deduced from de Pambour's formula bear no such relation to each other. On the contrary, the two results are sometimes nearly coincident, and then deviate very widely, &c. For instance, (Railroad Journal, vol. IX, p. 45,) we have deviations from experiments of 10, 31, 18, 11, 26, 57 per cent. in one set of trials; and 35, 30, 38, 19, 5, 10, 18, &c., in others. Those, therefore, who refer the errors of the formula to the intervention of crank motion, are reduced to the dilemma of explaining results which differ in every assignable degree from experience, without order or rule, upon the principle of an invariably proportionate loss; and if the formula had been constructed without any reference to crank motion, its deviations from experience would, for this reason, require some very different cause to explain them. But,

2. The suggestion is not in any degree pertinent, inasmuch as the loss of effect from crank motion is already provided for in de Pambour's formula!

This last is a palpable paradox, but a glance will suffice to render it intelligible. For let it be observed that this *resistance* of an unloaded engine is incorrectly named, when designated friction. It is indeed a compound result, including within it the effect of the crank: and is, in fact, the *friction proper* to all the rubbing parts of an engine *increased* in the ratio of the loss from crank motion. So when an engine is tracking a train of cars, the total tractive force is made up of the friction proper to the cars and of the resistance of the engine, now still greater than when unloaded, in proportion to the degree of pressure thrown upon its rubbing parts by the train in convoy; which resistance includes, as before, the effect of crank motion.

When, then, the value of the total resistance of the engine, per ton* of

* The actual loss of power from crank motion in engines of this class is always less than 6 per cent. For the friction per ton of load upon a level being 8 pounds, and the in-

its own weight and of its load, is ascertained and employed in estimating the total tractive force, the effect of the crank is exactly provided for in a very unexceptionable way, viz., experimentally.

Now both these quantities were determined by de Pambour as elements of his formula; and, therefore, although he nowhere notices in direct terms the effect of the crank in reducing the power, it is by implication, in this way perfectly eliminated. Nothing, therefore, can be more absurd, than to look for the discrepancies of this formula in the omission of elements which its author proved by experiment to be inseparable from it, and for which exact provision had been made.

Every fair and competent valuation of de Pambour's expression will reproduce the train of disorderly errors detailed in the above numerical statements, and that, too, without omitting the effect of the crank; and will hint sufficiently the necessity of having recourse to other primary causes than crank motion, or any other influence bearing a given relation to the power, for an explanation of them. It will be matter for astonishment to me if any engineer will prove that the evaporating capacity of modern locomotives, (and, therefore, their power,) is not increased with the velocity of motion, and in a very great degree; and that the air does not oppose the motion in proportion to the amount of actuating surface; or that these two elements (the one retardative, the other a much more powerful auxiliary, which will exert the utmost influence upon the powers of these engines in the future,) taken together, each according to its specific law and coefficient, do not solve every difficulty.

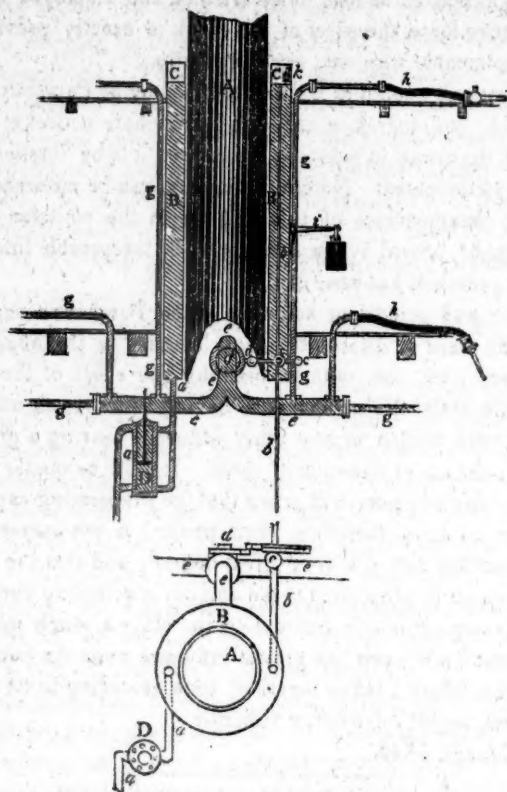
Albany, Murch, 1840.

For the American Railroad Journal and Mechanics' Magazine.

DESCRIPTION OF H. R. & J. E. SERRELL'S IMPROVED MEANS FOR PREVENTING AND EXTINGUISHING FIRES ON BOARD STEAM VESSELS.

A double cylinder, B, closed air tight at both ends, is to form a ring around the smoke pipe A, and to be about two inches clear, around the same; the cylinder to extend from the top of the boiler upwards, above any wood or deck work near the smoke pipe; the cylinder is to be nearly filled with water, by a force pump D, worked by the engine when running, or by hand if required, when the engine is not running. A waste pipe *b*, inside the cylinder whose top shall reach within about one foot of the top of the cylinder, is to carry off the surplus water from the cylinder, either to the boilers, or over the side of the vessel; and the space left in the top of the cylinder, becomes an air chamber C.

crease of resistance in engines rating 1 pound per ton of load reduced to a level, the fraction $1-8 = (12 \text{ per cent.})$ expresses the total proportion of resistance brought into action by the operation of the engine; and but a part of this is due the effect of the crank. Again, the total resistance of an engine per ton of its own weight is 15 pounds, and 8 pounds of this at least is due the friction of the wheels; consequently $\frac{1}{8} \times \frac{15-8}{15} = .058$ (less than 6 per cent) is the greatest diminution of power attributable to crank motion. It has often been erroneously estimated at 3 or 4 times this amount; but a proper theoretic investigation fully confirms the result which has been established by experiments.



A main pipe *e*, and branch pipes *g*, leading from the cylinder, are to terminate in hose, with cocks and nossels *h*, in any part of the vessel, and a cock *c*, in the waste pipe *b*, is connected to the cock *d*, in the main *e*, by the communication *f*; and shutting the cock *c*, in the waste pipe *b*, opens the main cock *d*; converting the whole apparatus into an effective fire engine, (whose power is regulated by the capacity of the force pump) and at the same time supplies all the pipes which have the hose with cocks and nossels, making them available for quenching a fire in any part of the vessel.

A safety valve in the cylinder prevents breakage, through the pressure given to the water by the force pump. The reverse valve *R*, allows the ingress of air when wanted in the air chamber.

FOURTH ANNUAL REPORT OF THE WESTERN RAILROAD CORPORATION.

To the Honorable Legislature of the Commonwealth of Massachusetts:

(Continued from page 224.)

The *timber* wanted for the same purpose, has been, principally, contracted for; and that for the part of the road west of Pittsfield, is in course of delivery.

The damages for land and fencing have been settled and paid, and the titles secured for about 40½ miles.
 They have been liquidated by agreements in writing, for 11½ "
 Settled by appraisals of commissioners, for 6½ "
 And are unsettled for 3.6 "

Total, 62.6 "

Convenient depot lands have been secured for seven stations, west of the river; and those for others are offered upon advantageous terms, when the locations shall be agreed upon. No one of the stations has, as yet, been actually located by vote of the directors; but the subject is in the hands of a committee, for a personal examination.

The receipts and expenditures of the corporation, for the year past, as stated by the treasurer, as of January 1, 1840, are as follows, viz:

Receipts.

Balance of 4th annual account, Jan. 1, 1839,	\$354,055 56
Received on 3d Assessment,	\$2,975 00
" 4th "	4,485 00
" 5th "	7,350 00
" 6th "	8,505 00
	<hr/>
	23,315 00
" for sale of timber lands,	990 64
" on transportation department,	17,425 63
" for state scrip sold (profits paid sinking fund) par, is	501,329 54
" for exchange drawn agt. scrip unsold	655,114 52
	<hr/>
	1,156,444 06
Outstanding drafts by engineer, in favor of contractors, accepted, and not yet due,	57,850 05
Amount due Baring, Brothers & Co., Liverpool,	12,526 05
" Geo. W. Whistler, agt. moving power,	1,490 85
	<hr/>
	\$1,624,097 84

Expenditures.

Amount paid for incidental expenses,	15,921 38
" " construction, including iron,	1,225,235 55
" " engineer department,	38,053 16
" " land damages,	54,591 23
" " depot lands,	6,439 27
" " interest on bonds or scrip,	39,965 91
" " engines, cars, etc.,	69,670 21
" " fuel etc.,	6,596 68
" " depot buildings, etc.,	60,751 15
" " expenses transportation depart.,	13,299 47
" " contingent fund,	1,290 97
Balance,	92,282 86
	<hr/>
	1,624,097 84

Transportation Account.

The total amount of receipts from the business of the road, for 3 months prior to January 1, 1840, was,

For transportation of passengers, three months,	\$13,472 94
" merchandise, two months nine days,	4,136 21
Total receipts,	<hr/>
	17,609 15

The expenditures of this department for the same time, were,	
For repairs of the road,	1,076 00
" " engines and cars,	1,004 43
Miscellaneous expenses, including clearing snow,	12,300 21
	<hr/>
	14,380 64
Balance,	<hr/>
	\$3,228 51

The amount of *capital paid in*, is the proceeds of six assessments of \$150,000 each, laid upon the stock, amounting in the whole to \$900,000.

And there has been collected upon these on the first of January, inst. the following sums, viz:

On the 1st assessment,	\$150,000
" 2d "	150,000
" 3d "	148,835
" 4th "	148,455
" 5th "	148,450
" 6th "	148,175
	<hr/>
	893,915
Balance due and uncollected,	\$6,085

This small deficiency is constantly diminishing by means of collections. And the treasurer anticipates but a very small eventual loss upon all the assessments, including notes secured by a pledge of stock.

And it is believed that a contingent fund, on hand, will cover a considerable part of it.

The act of the legislature of 1838, authorized the loan to the corporation, of the scrip of the State, having 30 years to run, for the sum of \$2,100,000, on the condition of the collection of certain proportions of six assessments upon the stockholders. The whole of these assessments was \$900,000, and there has been collected thereon, on the 1st of January inst. as before stated, the sum of \$893,915, being a much larger amount than was required by the act. A small portion of the 4 last assessments was in notes, secured by sureties or a pledge of stock.

The act further required, that the corporation should execute to the Commonwealth, a *bond*, to apply the proceeds to the construction of the road, and to pay the principal and interest of the scrip, as it should fall due; and should *mortgage* the whole road, and all the franchise, and property belonging to the corporation, to secure the performance of the conditions of the bond. This requisition has been complied with, the bond and mortgage were given, and the interest on the scrip has been punctually paid by the corporation.

Another provision of the act required, that the premium or profits on the sales of the scrip should be paid to the Treasurer of the Commonwealth and, that to this should be added, annually, after the road should be opened for use, a sum equal to one per cent. on the amount of the scrip, from the income of the road; and that the whole should by the Treasurer be placed at interest, and the same, with the interest annually accruing thereon, should constitute a *Sinking Fund*, for the future purchase or final redemption of said scrip. The premium or profits on the sales of scrip heretofore, so far as the accounts of sales have been received, have been duly paid over to the Treasurer of the Commonwealth, as will hereafter appear. And the whole is now under the care of the commissioners of the sinking fund, as provided in an act of the last Legislature.

The act of March 23, 1839, authorized a further issue of scrip, upon terms similar to those of the first act, for such a sum as might be necessary to enable the corporation to complete their road, not however exceeding

\$1,200,000. Of this sum, the issuing of \$400,000 is on condition that the corporation previously collect the sum of \$75,000 upon a 7th assessment upon the private stockholders, and another \$400,000 is upon condition of a similar collection upon the 8th assessment.

The act further provides, that the Commonwealth *may, at any time after its passage*, purchase the road, and all the property of the corporation, by paying therefor the cost, and 7 per cent. interest.

This act has been assented to by the stockholders at a legal meeting; and the bond and mortgage thereby required have been filed with the Treasurer.

The whole of the scrip authorized by the act of 1838, has been received by the corporation, being	\$2,100 00 00
And also the first instalment under the act of 1839,	400,000 00
Of the former, there had been sold in England, at the date of the last advices,	\$1,228,000 00
And the Treasurer of the corporation has drawn upon the agents, against the balance of scrip unsold, and in anticipation of farther sales,	655,114 52
Making total amount drawn for,	<u>\$1,883,114 52</u>

The scrip disposed of has been sold at an advance or profit above par value, averaging $3\frac{1}{4}$ per cent., and it has always commanded a much higher price than any similar American scrip.

Sinking Fund.—The profits arising from the sale of the scrip above mentioned as already sold, being \$1,228,000, result, 1, from the *premium* for which the same has been sold above the par value, and 2, from the premium on the exchange drawn for the same, and they amount to the sum of

\$137,605 30

These profits are regularly paid over to the commissioners of the sinking fund, as fast as the accounts of sales are received from the agents;—and occasionally transfers are made to that fund in anticipation of those accounts. The amount so paid over from time to time, was, on the 1st inst., \$115,528 29. And about \$22,000 more will be paid over during the month of February next.

To the above sum is to be added the premium on the exchange heretofore drawn against the scrip unsold, as before stated, viz., \$655,114 52, which is

\$64,251 25

And which makes the amount *in hand* to accrue to the fund from profits on \$1,228,000 sold above par, and the premium on exchange already drawn on \$1,883,114 52,

\$201,856 55

This is exclusive of any advance on the future sales of the scrip to meet the \$655,114 52 drawn against it. But as the whole scrip has been sold at an average premium of $3\frac{1}{4}$ per cent., it is safe to say, that that amount of scrip will, on sale, yield an advance of 1 per cent. *net*, say,

6,551 14

Total profits on \$1,883,114 52 of scrip, or a little over 11 per cent.

\$208,407 69

If it shall be found necessary to use the whole of the \$1,200,000 of the scrip authorized by the act of 1839, in order to complete to road west of Connecticut river, there will remain unsold and undrawn for,

January 1, 1843, the whole of that amount,

\$1,200,000 00

And the balance of that issued under act of 1838,

216,885 48

Total as the basis of further profits hereafter,

\$1,416,885 48

If the same profits are realized upon this as upon the preceding—11 per cent., the amount from it will be \$155,857 40
 To which add proceeds realized as above, 208,407 69

And it gives the total amount of the principal of the fund, from this source only, \$364,265 09

Which is exclusive of the 1 per cent. on the amount of the scrip, or \$33,000 annually to be paid to the fund from the income of the road.

This sum of \$364,265 09, is to be placed on annual interest as received and secured in the manner prescribed in the sinking fund act, and to accumulate until the scrip falls due. It is understood, that the amount already paid over to the commissioners of the sinking fund, being \$115,528 29, has been readily loaned on the best security, at 6 per cent. interest, payable semi-annually. And no doubt is expressed by them, that the whole may be loaned at the same rate. As the fund is *managed without charge* we may then safely assume that for the whole time, the fund may be made to produce at least $5\frac{1}{2}$ per cent. annually.

The scrip is all payable 30 years from its date; and being dated and issued at different periods, it is found that to *average* the whole, it is equivalent to a scrip of \$3,300,000, falling due about April 1, 1869.

Upon the whole principle, the *average* time, at which the whole profits will be paid over to the fund and put on interest, will be about October 1, 1840.

The interest, therefore, should be computed on the whole \$364,265 09 from October 1, 1840, to April 1, 1869, or $28\frac{1}{2}$ years. This at $5\frac{1}{2}$ per cent. annually will increase this item to \$1,610,031 53

To this is to be added, the one per cent. on the amount of the whole scrip, or \$33,000 annually, required to be paid to the fund from the income of the road, *after it is opened for use*. Should the first payment from this source be made October 1, 1842—and the annual payments extend to April 1 1869, the average time the whole scrip falls due—it will give $26\frac{1}{2}$ years. The annual interest at $5\frac{1}{2}$ per cent. on these yearly payments will increase them to the sum of 1,937,880 14

Giving the proceeds of the sinking fund, when the scrip falls due at $5\frac{1}{2}$ per cent., \$3,547,911 67

Which will over pay the principal by 247,911 67

As stated in last year's report, "this surplus may be applied to the expenses of remitting the money to England, when due, if, as is probable, exchange should then be against us. And if a larger amount should be wanted for that purpose, a portion of the income from the business of the road, may be set apart, annually, for a few years prior to the time when it may be wanted."

"It is intended that the semi-annual interest falling due upon the scrip, shall be paid by the corporation from the accruing income of the road.—And a net income from the business, of 6 per cent. on the cost of the road, will pay the 1 per cent. annually to the sinking fund—5 per cent. interest on the scrip, and give a dividend of 6 per cent. to the stockholders, on the amount advanced by them.

If as is now the fact, the fund is loaned at 6 per cent. instead of $5\frac{1}{2}$, it will produce, when the scrip falls due, the sum of \$3,870,449 10

Which will over-pay the principal by 570,449 10

A surplus amply sufficient to meet unexpected losses, deficiency of in-

erest for short times, expenses of the fund, and cost of remitting the principle when due.

In view of these facts, and of the uninterrupted success which has attended all the financial operations of the corporation heretofore, the undersigned cannot omit the expression of their entire confidence, that the Commonwealth is perfectly secure for the whole amount of the loan of credit to the corporation, and that neither the State, or the stockholders, will ever be called upon to pay a single dollar of that loan.

Unless there is some fallacy in the foregoing calculations, which no one has, as yet, been able to detect—although they have, in effect, been before the public for two years past—the sinking fund will, of itself, be amply sufficient to meet the principal of the loan. The accruing interest upon it has been heretofore paid by the corporation, and there is no reason to doubt that it will be punctually met by them hereafter. If it is not, the Commonwealth, holding a mortgage of the entire road, and all the franchise and property of the corporation, have a right, by the terms of the grants, to take *immediate possession* of the whole, receive the income, and apply such part as may be necessary, to pay the interest;—or they may farm it out for the purpose, at their election. This they may always do, without re-paying to the private stockholders the \$800,000 which they shall have paid in assessments towards the construction of the road.

Supposing the whole scrip to be necessary to finish the road, the mortgage is of a property costing four and a half millions of dollars, to secure a loan of \$3,300,000, and a property too, which must produce an ample income, to be annually increased by the increasing business of the country. It cannot, therefore, by any reasonable man be doubted, that the Commonwealth have most abundant security for this loan of their credit to advance this great public enterprise. They have, in effect, only indorsed the paper of the corporation, or guaranteed their credit; taking, not only sufficient eventual security, but such as they may take into immediate possession on the first default.

And, in order further to provide against loss, four of the nine directors are annually chosen by the Legislature; thereby giving the State certain means of knowing the whole operations of the corporation, and of watching even the minutest expenditure of its funds.

But, superadded to all this, is the provision of the act of 1839, that the Commonwealth may *at this moment*, or at *any* future time, near or remote, purchase the whole road, with all its appurtenances, and all the property of the corporation, by paying therefor, the amount of capital paid in, and seven per cent. per annum interest, or profit thereon from the times of the payment of the same by the stockholders, deducting any dividends that may have been received—thus securing to the State the right to buy the road, virtually at cost, if it should prove profitable, and leaving it with the stockholders, subject to the mortgage, if it should not be so productive, as to tempt to its purchase.

It should be borne in mind also, that the enterprise was one too great for private capital; that no one subscribed to it for investment, merely, but in order to promote a great public improvement, and that it could not have been accomplished without this extended aid from the State.

It would seem, then, in view of all these considerations, that no citizen of Massachusetts who values her prosperity, however fastidious he may be, can persuade himself, that former legislatures have been unwise in these grants, or indiscreet in the manner, in which they have been protected.

The directors improve this opportunity, also, to express their conviction,

that the whole road to the western line of the State, will be finished, with all the equipments necessary to put it in order for use, by means of the funds already provided for the purpose.

The resources provided for the work, results,

1. From assessments on the stock,	\$1,200,000
2. Scrip of the State,	3,300,000
Total,	\$4,500,000

The cost of the part of the road completed east of the river, is before stated at \$1,972,985 97

Leaving applied and applicable west of the river, \$2,527,014 03

The cost of road west of the river, was estimated in December, 1838, with as much care as was practicable, after all the principal objects of expenditure were under contract; and when the principal items of cost were well understood, with the exception, perhaps, of the grading and masonry through the mountain division. The total estimate for putting this part of the road in order for use, was, as stated in the report of last year, \$2,326,442 61

Leaving a surplus of resources, above the estimates of \$200,571 42
And it can hardly be believed, that the actual cost will exceed the estimates by this amount.

As to the probable *income* of the road, there has as yet been no opportunity to test it. It cannot be fairly judged of, until the western part of it has been for at least one year opened for use. The part east of the river had been in operation for passengers three months, and for merchandise two months only on the 1st of January inst, the time to which the accounts are made up. And this was under the most discouraging and adverse circumstances. It embraced a season of the year, when even in prosperous times, few railroads in New England receive an income equal to their current expenses. The whole period was one of unusual depression with the business community;—and when no one travelled except from necessity. The embarrassments attending the manufacturing and other active interest of the country were such, that all engaged in them have forborne to procure supplies beyond their immediate wants. The proper department having declined for the present to transfer the public mail to the cars, the stage-coaches having the advantage of the contracts have been running, on the same line of travel, in active competition with the road, and at fares much reduced.

The winter thus far has been one of uncommon severity, attended by a succession of deep snows, now accumulated to an extent, unknown for many years, and requiring heavy and repeated expenditures in clearing the track, and access to the road, both by passengers and for merchandise has been, from this cause, seriously interrupted. It may be added also, that the business upon the Connecticut river, from which much is expected hereafter, has been entirely closed for a great part of the time.

It will readily be seen, therefore, that the results in the short period during which the road has been opened, can afford no criterion by which to judge of its productiveness. The undersigned have never anticipated that, for the first six months of its operations, the income of the road would more than meet its expenses. But they are happy to find, by the statement of the account before given, that, under all the discouragements to which they have alluded, *the road has more than "paid its way,"*—the receipts having exceeded the expenses by about 22 per cent.

Upon the opening of the spring, and the revival of business from its present depression, the Directors anticipate a successful and constantly increasing business upon the road. The advantages of this means of communication are more and more felt in towns remote from the line; and new lateral roads are opening, and new lines of stages establishing, to accommodate the new courses of travel. The Hartford and New Haven railroad has but just commenced operations, thus presenting a continuous and more inland communication by steam, between Boston and New York. The produce and merchandise of the populous and flourishing towns in the valley of the Connecticut, for near 200 miles north of Springfield, have heretofore been transported, principally, by teams, to and from Boston, at a great expense. And it has been ascertained, that, at the distance of, at least, 50 miles north of Springfield, about 50 per cent. of that expense may be saved by the river and railroad transportation united, and a corresponding advantage gained, in the more northern towns. In order to attract public attention to this subject, and to procure and give information, an agent is now on a tour up the river, and it is believed, that a new and valuable business may be realized from this source the coming season.

But all these arrangements require time and long continued attention for their completion, and the results, so far as they may affect the income of the road, must not be looked for too hastily. In conclusion, the undersigned see no reason to doubt, that the early anticipations of the friends of this enterprise, will in time be fully realized; and they are encouraged to believe, that those friends will be stimulated to continued effort, until they shall see this great thoroughfare in successful operation, through the centre of the State, from the seaboard to its most western boundary.

Thomas B. Wales, Josiah Quincy, Jr., John Henshaw, George Bliss, Amasa Walker, Charles Hudson, John Howard, *Directors*.

SECOND ANNUAL REPORT OF THE WEST STOCKBRIDGE RAILROAD CORPORATION.

To the Honorable the Legislature of the Commonwealth of Massachusetts:

The directors of the West Stockbridge railroad corporation do make this their second annual report of their acts and doings, receipts and expenditures, under their act of incorporation.

The length of the said road being only about two and three-fourth miles in length, it was originally contemplated by said corporation and by the Hudson and Berkshire railroad company, to unite said roads, and both companies passed resolutions to that effect, and leave was obtained of the legislature of the State of New York so to do and both corporations filed their respective petitions to the legislature of this Commonwealth at their last session, praying for this liberty, which petitions were not acted upon, in consequence of the right reserved to the Western railroad to buy the West Stockbridge railroad, but were continued to the present session.

With these views, the Hudson and Berkshire railroad corporation, (by James Miller, their president,) subscribed a large amount to the stock of the West Stockbridge railroad corporation, and put on the superstructure, and nearly completed the stone depot, at the eastern termination of said railroad, before the first report was made. Since making said report, said company have completed said stone depot, and have erected a stone engine house, and store house, and wood house, at said depot, and have been running their locomotives and cars over said West Stockbridge railroad, since making the first report under a lease, in which said company were obligated to pay an equal amount of the net proceeds of both roads, proportionate to the cost of each road, by the first day of April next, the expiration

of said lease. By reason of this understanding, said West Stockbridge railroad corporation, have not been as particular, as they otherwise would, but have permitted said Hudson and Berkshire railroad corporation to put on said superstructure, and erect said buildings, and are unable to state the cost of the same, or the income of the road, as the account has not yet been rendered.

By a statement of the Treasurer now exhibited, it appears that the rents of the corporation, have been,

From stockholders and advances made by directors,	\$11,644 02
And the expenditures for land damages, grading the road, and building bridges, and incidental expenses,	11,310 14
All which is respectfully submitted.	

Daniel Spencer, Jr., Erastus Crocker, Thomas Cone, Martin Hendrix, Lyman Hinman, Sylvester Spencer.

RECEIPTS ON THE HARLEM RAILROAD.

Fare for passengers for March, 1840,	\$6,444 39
" " March, 1839,	4,634 16
	\$1,810 23
Fare for January, February and March, 1840,	\$15,369 83
Fare for January, February and March, 1839,	10,651 52
	\$4,718 31

Showing an increase the first quarter of this year over the corresponding quarter of last year, of \$4,718 31, equal to 44½ per cent.

Total receipts for fare for the year ending on the 1st of April, 1840, is one hundred and four thousand, five hundred and one dollars fifty-four cts.

ERIE CANAL TONNAGE.—The tonnage moving on the Erie Canal during the year 1839, by a late report of the State officers, amounted to 845,167 tons. Of this quantity 282,244 tons came on to the canal west of Montezuma intermediate to Buffalo, and from beyond our own State. The Oswego Canal yielded 221,014 tons; the Cayuga and Seneca, 26,300; Chemung, 36,089; Crooked Lake, 26,823; Chenango, 16,928—all entering the Erie canal east of Montezuma.

The product of the forest, in lumber, timber, etc., floated on the Erie canal, amounted to 437,736 tons. From agriculture, in breadstuffs, the tonnage was 124,683, being less than the average tonnage in these articles for the last six years. The forest is decreasing, while it is certain that agriculture, manufactures, and other articles will not supply the deficiency for a long period of time.

That the capacity of the Erie canal, in its present state, even with single locks, is adequate to the transportation of all the products of the forest, agriculture, etc., is proved from the report of the commissioners of the canal fund, in Assembly doc. No. 63. It is stated page 12, that the tonnage has decreased from 753,191 tons, coming to tide water in 1835, to 602,128 tons in 1839; a falling off of 151,062 tons. Further, the lockages, at the most crowded point (Alexander's lock, three miles east of Schenectady) has decreased during the last six years from 25,798 to 24,234—to 1564 lockages. It is stated that 242 lockages have taken place in one day, without full employment to the canals, viz. 177 lockages east, and 65 west. This would give at the same rate, for the last season of navigation, 51,186 lockages, instead of 24,234; in other words, it is a true indication of the capacity of the canal.

Under this view, is it not better to let the Erie canal rest for the present

and turn our resources, if they can be safely used, to complete our railroad system? The west will soon think so—the north and the south are already of this opinion. The improvements in the locomotive engine, and its capacity to draw large loads, at cheap rates, is claiming the attention of our neighbors. Massachusetts with her great western railway, will soon have a line from Boston to Buffalo. This will soon convince us in New York, that we must depend on something more efficient than canals and the Hudson river, to compete with our enterprising and prudent neighbors.

J. E. B.

[The great importance of the following report induces us to publish it entire, with the exception of the details of the property, depôts, &c. which are of no use to the professional reader, and occupy many pages of the pamphlet.

It may be remarked that this report contains the first complete description ever given of these works by the company.]

REPORT OF THE JOINT BOARD OF DIRECTORS, TO THE STOCKHOLDERS OF THE DELAWARE AND RARITAN CANAL, AND CAMDEN AND AMBOY RAILROAD AND TRANSPORTATION COMPANIES, ON THE COMPLETION OF THEIR WORKS; WITH THE PROCEEDINGS OF THE STOCKHOLDERS—AT THEIR MEETING ON THE 29TH OF JANUARY, 1840.

The works of the Delaware and Raritan canal, and Camden and Amboy railroad and transportation companies, are all completed in the best manner, and the heavy expenditures constantly accruing during the progress of their construction, are now at an end, upon which auspicious events, the directors offer their hearty congratulations to the stockholders.

A detailed statement of the property, owned by the companies, of all moneys received and payments made on account of the same, with the books of entries, authenticated by vouchers for the smallest sums expended, are herewith submitted for your inspection.

The management of your affairs, either good or bad, as you may this day determine, devolves upon the present board of directors. They have superintended them from the commencement to the present moment, and they welcome you most cordially to this examination, and hope for their credit, as well as your own and the public satisfaction, that you will give to it, the character of a most thorough and rigid scrutiny.

The accompanying statements will so clearly show the value of your canal and railroads, and the unexampled prosperity of the companies, that the directors feel it necessary to make some apology for indulging themselves in a single remark on the subject, and hope to find there excuse in the pride they feel in having directed these works, from their beginning to their final and triumphant completion. Formerly the passage between Philadelphia and New York occupied from eleven to twenty hours; and was performed with great personal discomfort, and no small hazard of limb and life. Merchandise was transported from city to city at great expense of insurance as well as of freight, and subject to all the difficulties, uncertainties and dangers of a coasting voyage. Now passengers are carried from city to city, during the most inclement seasons, in from six to seven hours, and with nearly the same comfort as they enjoy at their own fire sides. Merchandise is transported in less time, with less expense, and with an entire saving of the insurance.

They congratulate you on the immense public good that you have done. You have, at a less cost than other works of like magnitude, finished the

greatest and most valuable part of a system of internal improvement, you have completed for your country the most important link in the chain of communication between the northern and southern sections of the United States, which will afford to the general government the means of transporting their troops, and all the munitions of war, as well as the mails, in much less than half the time heretofore occupied, and at prices, which in comparison with like transportation during the last war, will save many millions of dollars to the public treasury. You have been mainly instrumental in bringing New York and Philadelphia in close proximity; in increasing the intercourse between these cities, from fifty-two thousand to one hundred and eighty-one thousand five hundred persons a year, and in reducing and equalizing the price of travelling, and also of fuel in New York and in the Eastern States. But while you have had such high aims for the general good, you have nevertheless regarded the interests of New Jersey as the "chiefest thing;" nor have you in our judgment miscalculated those interests.

You have constructed for *sixty-five* miles, through the heart of New Jersey, the *most* spacious canal, which adds year after year, thousands to the value of her agricultural interests, while it carries with it wealth and happiness to her citizens generally, and which may be referred to, as a lasting monument of the sagacity of New Jersey statesmen, and of your patriotism and munificence.

Besides making this expensive canal for them, you now furnish to the State of New Jersey an annual sum sufficient to pay the expenses of the State Government; and which will no doubt increase, so as to enable her to lay by the means to purchase all your works at the expiration of the lease, which you hold under her.

It is a matter of especial congratulation, that these gratifying results to the public have been obtained under the protection and patronage of various Legislatures, without distinction of party, and without any infringement of private rights, and may well stir up the pride of Jerseymen, when they look around and see the mortification and embarrassments, which have followed other systems of improvement adopted by different States of the Union. We, therefore, most earnestly congratulate you upon these public benefits, which through you have been achieved.

We now proceed to say a word or two in relation to the value of your property, and the tenure by which you hold it. Although you have paid for it, and New Jersey has not advanced or even loaned one dollar towards it, still the fee is in her, not in you. You are the lessee for a term of years only, and the State can, after re-imbursing you, dissolve the corporations; the railroad at the expiration of thirty years from and after its completion; and the canal at the expiration of fifty years from and after its completion. The relation that exists between you and the State, is simply that of landlord and tenant, with leave to improve, under limitations and restrictions, dictated by the State, on full advisement, accepted by you, and ratified year after year by different Legislatures, with all the solemnities of constitutional enactments and plighted faith; and it is with high emotions of State pride that we thus publicly bear witness, that amid all the taunts and reproaches heaped indiscriminantly upon corporations; amid the most earnest and plausible supplications of intriguing and designing men, amid the most extravagant offers of remuneration, New Jersey, her people, and her Legislators have stood firm to their own laws, and have invariably treated with contempt all efforts made to seduce her from her honor or her obligations towards you; and you may rely upon it that she never will allow you to be disturbed in the enjoyment of your corporate rights, especi-

ally as it has been your pride and constant endeavor to observe, on your part, the obligations you are under to the State. And why should she?—It is alike her interest, as well as her duty and wish to maintain inviolate her contract with you. She has leased for a valuable consideration, the rights you possess by your corporations, for the periods before specified. And what is thirty or fifty years in the lifetime of an Empire? Scarcely time enough to give a fair opportunity to determine whether your untried and adventurous experiment would succeed. The State is satisfied with the lease; she gives nothing, and gains every thing; she has furnished to her own citizens and the public, a communication as cheap, safe and expeditious as any in the country. Not only have these important works been secured, but the companies by their contract are restricted to the sum of three dollars for the transportation of passengers from city to city. If there is truth in experience and figures, you ought likewise to be satisfied your property, after a careful examination, is thought to be worth more than you have paid for it, if judged by the cost of other works of like kind here or abroad. The works have been constructed with rigid economy, having a proper regard to their durability, and will compare advantageously with any other, either in this country or elsewhere. A distinguished engineer from England, has recently examined them with attention, and has pronounced this opinion. The great object with the directors has been to preserve your capital unimpaired; and so to construct the works as to keep them as far as possible from deterioration, and up to this time they are as good as the day they were first used. They have become settled and firm.—Your capital, therefore, is not only quite safe, but has been improved.

We will now inquire how profitably it has been invested.

The receipts for the last six months show a profit of seven per centum, which, considering the depression of all kinds of business, is, in itself, enough to satisfy you as to the value of the investment. But to make "assurance doubly sure," let us look through the accounts for years past, and ascertain whether these receipts have been the effects of sudden and unexpected good fortune, or the quiet and natural result of a regular increasing business. It will be seen that there has been, from the commencement up to the present time, a regular and progressive increase of nett profits. As will appear from the following tabular statements, which have been taken from the books of the company by the committee, and may be relied upon as the true results of the several designated years:

An annual statement, showing the number of passengers and tons of merchandise transported across the State over the Camden and Amboy railroad.

Columns A. A. show the *relative* increase or diminution, of the number of passengers and tons of merchandise transported across the State. The year 1833 being estimated at a hundred.

	Number of Passengers.	A	Weight of merchandise	A
From Jan. 1st to Dec. 31st, 1833	109,908	100	6,043	100
" " 1834	105,418	95½	8,397	139
" " 1835	147,424	134	10,811	178½
" " 1836	163,731	149	12,508	207
" " 1837	145,461	132½	10,642	176
" " 1838	164,520	149½	11,765	194½
" " 1839	181,479	165	13,520	223½

Yearly statement of receipts and comparative statement of the same.

No. 1, Date. No. 2, Gross amount of receipts. No. 3, Comparative statement, showing the relative proportion that the receipts of the different years bear to the receipts of the year 1833. No. 4, Gross expenditures. No. 5, Shows the relative proportion that the expenditures bear to the receipts of the year 1833. No. 6, Nett gain. No. 7, Shows the relative proportion of the nett gain to the receipts of the year 1833.

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.
From Jan. 1, to						
Dec. 31, 1833	468,142 50	100	287,091 90	61½	181,050 60	38½
" " 1834	546,993 54	117	313,261 69	67	233,731 87	50
" " 1835	679,463 63	146	317,491 76	69	361,971 87	77
" " 1836	770,621 28	165½	363,344 90	78	407,276 38	87½
" " 1837	731,995 24	156½	359,510 44	77	372,484 80	79½
" " 1838	754,989 89	161½	355,249 10	76	399,740 79	85
" " 1839	685,329 76	146½	258,043 48	55	427,286 28	91½

From this statement it appears that there has been an annual increase of the nett profits of the companies of 20 per cent.

From the derangement of the monetary affairs of the country, and the stagnation of business for several years past, it will be at least fair to judge of the future prospects of the companies by the past. Supposing then there should be no greater increase for the next seven years, the nett profits will be in seven years from this time, one million and forty-two thousand dollars; from which deducting the interest on the loans, viz. one hundred and ninety thousand dollars, will leave the sum of eight hundred and fifty-two thousand dollars, or a dividend of upwards of 28 per cent. per annum.

It would make this report too long to enter into all the particulars that might be stated, fully to illustrate the causes of such a constantly increasing business. The following may serve to give you some idea of it, and of the progressive value of the investment. Two years since, at the request of some market people, in New Jersey, a line called the pea line, with two cars, was occasionally started from Camden to New York, with no other view or expectation than the accommodation of a very useful and respectable class of men. This line has steadily increased, until it has become profitable beyond all expectation. During the past year, it has been running daily, sometimes taking with it as many as sixteen cars laden, at the appropriate season, with peas, peaches, potatoes, asparagus, cabbages, live stock, and upon one occasion, (as incredible as it may seem) thirty tons of green corn. This connected with the gradual increase on the other lines, will enable you to judge, what you may fairly expect in a few years hence; always bearing in mind, that the expenses do not increase in the same ratio with the receipts, because the same capital can do a larger business, whilst the interest to be paid remains the same.

(To be continued.)

A GOOD MOVE ON THE WESTERN RAILROAD.—At the annual meeting of the stockholders, held on the 12th inst. it was voted unanimously, to instruct the directors to reduce the rates of fare and freight between Boston and Springfield one-third. The rates will be now 2.50 from Boston to Springfield, for passengers, and 3.75 per ton for freight. Thus inviting to the Boston market the trade of the whole Connecticut valley, by the strongest inducement, viz., a cheaper rate of fare and of freight than to any other market for sales or for supplies.—*Boston Gazette.*